



U.S. Department of Energy
~~Office of River Protection~~

P.O. Box 450, MSIN H6-60
Richland, Washington 99352

0073731

AUG 17 2007

07-ESQ-128

Ms. Jane A. Hedges, Program Manager
Nuclear Waste Program
State of Washington
Department of Ecology
3100 Port of Benton Blvd.
Richland, Washington 99354

RECEIVED
AUG 20 2007

EDMC

Dear Ms. Hedges:

SUBMITTAL OF HANFORD FACILITY RESOURCE CONSERVATION AND RECOVERY
ACT (RCRA) PERMIT MODIFICATION NOTIFICATION FORM 24590-HLW-PCN-ENV-
07-001

Reference: WA7890008967, "Dangerous Waste Portion of the Hanford Facility Resource
Conservation and Recovery Act Permit for the Treatment, Storage, and Disposal of
Dangerous Waste, Operating Unit 10, 'Waste Treatment and Immobilization
Plant.'"

This letter submits the Hanford Facility RCRA Permit Modification Notification Form 24590-
HLW-PCN-ENV-07-001 (Attachment 1). The form describes a requested Class 1 modification
to the Reference requiring approval from the Washington State Department of Ecology
(Ecology). A Bechtel National, Inc. certification statement is provided in Attachment 2.

Modification Notification Form 24590-HLW-PCN-ENV-07-001 updates Mechanical Data
Sheets (24590-HLW-MVD-HOP-P0015 and 24590-HLW-MVD-HOP-P0016) for the High-
Level Waste Facility Activated Carbon Adsorbers (HOP-ADBR-00001A/B and HOP-ADBR-
00002A/B) found in Appendix 10.6 of the Reference.

Ecology was provided an opportunity to review the modification notification form and the
associated information and comments were dispositioned.

If you have any questions, please contact me, or your staff may contact Lori A. Huffman, Office
of Environmental Safety and Quality, (509) 376-0104.

Sincerely,

Shirley J. Olinger, Acting Manager
Office of River Protection

ESQ:LAH

Attachments: (2)

cc: See page 2

Ms. Jane A. Hedges
07-ESQ-128

-2-

AUG 17 2007

cc w/attachs:

Administrative Record
BNI Correspondence
Environmental Portal, LMSI

cc electronic:

B. Dubiel, BNI
W. S. Elkins, BNi
B. G. Erlandson, BNI
P. A. Fisher, BNI
J. S. Hill, BNI
S. Murdock, BNI
P. Peistrup, BNI
D. Becker, Ecology
B. Becker-Khaleel, Ecology
E. A. Fredenburg, Ecology
T. A. Williams, Ecology
S. A. Thompson, FHI
A. C. McKarns, RL
D. J. Sommer, SCS

cc w/o attachs:

D. A. Klein, BNI
J. Cox, CTUIR
S. Harris, CTUIR
L. Cusack, Ecology
S. L. Dahl, Ecology
G. P. Davis, Ecology
G. Bohnnee, NPT
K. Niles, Oregon Energy
R. Jim, YN

Attachment 1
07-ESQ-128

Hanford Facility RCRA Permit Modification Notification
Form 24590-HLW-PCN-ENV-07-001

Quarter Ending September 30,
2007

24590-HLW-PCN-ENV-07-001

Hanford Facility RCRA Permit Modification Notification Form**Part III, Operating Unit 10****Waste Treatment and Immobilization Plant**

Index

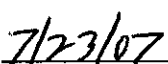
Page 2 of 4: Hanford Facility RCRA Permit, Operating Unit 10, Waste Treatment and Immobilization Plant
Update HLW Plant Item Mechanical Data Sheets for the High-Level Waste Facility Activated Carbon
Adsorbers (HOP-ADBR-00001A/B and HOP-ADBR-00002A/B) in Appendix 10.6 of the Dangerous Waste
Permit.

Submitted by Co-Operator:

Reviewed by ORP Program Office:




D. A. Klein



Date



S. J. Olinger



Date

Quarter Ending September 30,
2007

24590-HLW-PCN-ENV-07-001

Hanford Facility RCRA Permit Modification Notification Form	
Unit: Waste Treatment and Immobilization Plant	Permit Part & Chapter: Part III, Operating Unit 10
<p><u>Description of Modification:</u></p> <p>The purpose of this modification is to update HLW Plant Item Mechanical Data Sheets for the High-Level Waste Facility Activated Carbon Adsorbers (HOP-ADBR-00001A/B and HOP-ADBR-00002A/B) in Appendix 10.6 of the Dangerous Waste Permit. The following source mechanical data sheets are submitted to replace the permit data sheets currently in Appendix 10.6:</p> <ul style="list-style-type: none"> Mechanical Data Sheet Activated Carbon Adsorber (24590-HLW-MVD-HOP-00015, Rev 1) Mechanical Data Sheet Activated Carbon Adsorber (24590-HLW-MVD-HOP-00016, Rev 1) <p>The above mentioned mechanical data sheets include revisions as indicated by revision triangles shown on the documents. The revisions shown are the result of ongoing design (changes from vendor preliminary data to vendor detailed design). The following are the sections affected by changes to the above mentioned mechanical data sheets:</p> <ul style="list-style-type: none"> Incorporation of Environmental Qualification information (New Section) Incorporation of Code 1 vendor submittal information <ul style="list-style-type: none"> Thermal Information <ul style="list-style-type: none"> Revised maximum heat loss from 0.5 Kw (per unit) to 5 Kw (per unit) Activated Carbon Data <ul style="list-style-type: none"> Revised the type of carbon for the guard bed from Desomix G-10 to Desomix ZA-37 Revised the activation element from sulfur to sulfur compounds for the primary bed and from powdered coke & hydrated lime to unimpregnated activated charcoal for the guard bed Revised the carbon media form from spheres to granular for the guard bed Bulk density is revised from 0.48 g/cc (30 lbs/ft³) to 0.57 g/cc (36 lbs/ft³) for the primary bed and from 0.85 g/cc to 0.57 g/cc (36 lbs/ft³) for the guard bed Residence time is revised from 2.9 to 6 (at design flow rate in SCFM) for the primary bed and from 1.45 to 3 (at design flow rate in SCFM) for the guard bed Total volume of carbon has been clarified to be per vessel and is revised from 200 ft³ to 220 ft³ for the primary bed and from 100 ft³ to 110 ft³ for the guard bed Total weight of carbon has been clarified to be per vessel and is revised from 6590 lbs to 7920 lbs for the primary bed and from 5600 lbs to 3960 lbs for the guard bed The face velocity through the carbon is revised from 34.5 fpm to 16.67 fpm (at design flow rate in SCFM) for both the primary bed and guard bed House/Vessel <ul style="list-style-type: none"> Revised the material/thickness from 1/4 inch to 3/8 inch Vessel dimensions are revised from 132.5"x96.5"x156" to 138"x112"x156" Revised the total weight of the vessel from an estimated 15,000 lbs to an estimated 22,670 lbs per vessel Revised the weight of the vessel with carbon from 28,000 lbs to 34,550 lbs Design pressure is revised from -80 in-WG to -82 in-WG and added a positive design pressure of 126 in-WG Revised the operating pressure from -51 in-WG to -18.1 in-WG Design temperature is revised from 275 F to 250 F Revised the housing insulation material thickness from 4-6 inches to 7 inches on sides, 	

Quarter Ending September 30,
2007

24590-HLW-PCN-ENV-07-001

- 1 inch over stiffeners
 - Revised the unloading on/off valve from 4 to 8 per vessel and from 4 inch to 8 inch size
- Discharge Filter
 - Filter material is revised from microglass fibers to microglass paper
 - Clarified filter frame material is type 316
 - Revised dimensions of filter from 24" x 24" x 4" to 23 3/8" x 23 3/8" x 3 3/4"
 - Revised the weight of the filter from 10 lbs to 15 lbs
 - Revised the maximum allowable temperature from 300 F to 250 F
- Connecting Pipe
 - Revised the material/thickness from 0.188 inches to 0.25 inches
 - The total length of piping is revised from 50 ft to 70 ft
 - The weight of the valve is revised from 150 lbs to 143 lbs
 - Revised the valve manufacturer from Ionex to Centerline Valves
 - Removed the option of using electric actuators
 - Revised actuator manufacturer from Rotech to Hi-Tork
 - The minimum actuator operating pressure changed from 100 to 80
 - Revised the opening time from less than 5 seconds to less than 10 seconds
 - The required instrument air supply is revised from less than 1 to 2 SCFM per actuator
 - The recommended piping insulation material thickness is revised from 4-6 inches to 1 inch
- Construction Data
 - Operating weight of the unit (2 vessels) is revised from 56,000 lbs to 69,100 lbs
 - Full water flood weight of unit (2 vessels) is revised from 89,000 lbs to 114,100 lbs
 - Shipping weight is revised from 56,000 lbs to 71,500 lbs

There are no outstanding change documents associated with these mechanical data sheets.

Appendix 10.6					
Replace:	24590-HLW-MVD-HOP-P0015, Rev. 0	With:	24590-HLW-MVD-HOP-00015, Rev. 1		
Replace:	24590-HLW-MVD-HOP-P0016, Rev. 0	With:	24590-HLW-MVD-HOP-00016, Rev. 1		
WAC 173-303-830 Modification Class: ^{1 2}		Class 1	Class ¹ 1	Class 2	Class 3
Please mark the Modification Class:			X		
Enter Relevant WAC 173-303-830, Appendix I Modification citation number:		N/A			
Enter wording of WAC 173-303-830, Appendix I Modification citation:					
In accordance with WAC 173-303-830(4)(d)(i), this modification notification is requested to be reviewed and approved as a Class ¹ 1 modification. WAC 173-303-830(4)(d)(ii)(A) states, "Class 1 modifications apply to minor changes that keep the permit current with routine changes to facility or its operation. These changes do not substantially alter the permit conditions or reduce the capacity of the facility to protect human health or the environment. In the case of Class 1 modifications, the director may require prior approval."					

¹ Class 1 modifications requiring prior Agency approval.

² If the proposed modification does not match any modification listed in WAC 173-303-830 Appendix I, then the proposed modification should automatically be given a Class 3 status. This status may be maintained by the Department of Ecology, or down graded to a Class '1, if applicable.

Quarter Ending September 30,
2007

24590-HLW-PCN-ENV-07-001

Modification Approved: <input type="checkbox"/> Yes <input type="checkbox"/> No (state reason for denial)	Reviewed by Ecology:	
<u>Reason for denial:</u>	B. Becker-Khaleel	
	Date	



River Protection Project
Waste Treatment Plant

MECHANICAL DATA SHEET ACTIVATED CARBON ADSORBER

ISSUED BY
RPPWTP PDC



PLANT ITEM No.

24590-HLW-MV-HOP-ADBR-00001A/B

Data Sheet No.

24590-HLW-MVD-HOP-00015

Rev.

1

Project:	RPP-WTP	Description:	Activated Carbon Unit for Mercury Abatement
Project No:	24590	Mech. Drawing:	
Site:	Hanford	P&ID:	24590-HLW-M6-HOP-00003
System:	HOP	Process Data:	24590-HLW-M6D-HOP-00001 and calculation 24590-HLW-M6C-HOP-00011
Process flow diagram:	24590-HLW-M5-V17T-00004	Specification:	24590-WTP-3PS-MWK0-T0001

General Data

Quality Level	QL-2	Design Life yrs	40 (See Process Note C for media design life requirement)
Seismic Category	SC-III		
Design Code	Note 2		
Code Stamp	N/A		
NB Registration	N/A		

Process Data

Inlet Offgas Conditions:				Gas Composition:					
		Conditions				Nominal (%)	Max (%)		
		Nominal	Max	Design					
Vol. Flow	ACFM	1559	1984	2000 SCFM @ 68 °F	N ₂	70.6	64.7	(By Volume)	
Mass Flow	lb/hr	5492	6347	N/A	O ₂	18.9	17.4	(By Volume)	
Temperature	°F	168	205	250	Ar	0.8	0.8	(By Volume)	
Pressure	in-WG	-10.4	-18.1	-82	CO ₂	0.4	0.6	(By Volume)	
Density	lb/ft³	0.059	0.054	N/A	H ₂ O	9.2	16.4	(By Volume)	
Relative Humidity	%	23.2	18.3	N/A					
Allowable Pressure Drop		in-WG		12 (Note B)		Nominal		Maximum	
						(ppmv)	(mg/m³)	(ppmv)	(mg/m³)
Process Notes: A. Carbon beds shall be operated in series during normal operation. B. Allowable pressure drop is for both carbon beds HOP-ADBR-00001A and B operating in series. (12 in-WG total) C. Design life of activated carbon media shall be for one year at nominal concentrations of Mercury with the beds operating in series. D. Equipment design pressure (Positive) shall be determined by Seller based on pressures generated during a carbon bed fire and activation of the fire suppression water.					CO	40	34	65	50
					NO _x	614	606	2,700	2,600
					NH ₃	69	36	61	29
					SO ₂	0.047	0.093	0.032	0.056
					HCl	3.8E-03	4.3E-03	0.023	0.023
					HF	0.22	0.14	1.8	0.99
					I ₂	2.9E-09	2.3E-08	1.3E-04	8.9E-04
					SVOC	5.6	22	0.45	1.6
					VOC	9.7E-08	2.3E-07	0.22	0.47
					Particulate	2.9E-10	2.2E-10	7.3E-10	7.9E-10
					Mercury Concentration:				
						Nominal		Design	
	(µg/dscm)		(µg/dscm)						
Hg	5100		42000						
Decontamination Factor (DF) for Hg					1000				
Min Carbon Change Out Frequency					months	12 (Note C)	At nominal values		

Please note that source, special nuclear, and byproduct materials, as defined in the Atomic Energy Act of 1954 (AEA) are regulated at the U. S. Department of Energy (DOE) facilities exclusively by DOE acting pursuant to its AEA authority. DOE asserts that pursuant to AEA, it has sole and exclusive responsibility and authority to regulate source, special nuclear, and byproduct materials at DOE-owned nuclear facilities. Information contained herein on radionuclides is provided for process description purposes only.

1	Revised to comply with CODE 1 vendor Submittal (24590-QL-POA-MWK0-00001-09-00001), in accordance with CAR: 24590-WTP-CAR-QA-05-120. Added Environmental Qualification.					12/6/05
0	Issued for Purchase	J. Rouse	D. Pease	C. Morley	M. Hoffmann	9-20-04
Rev.	Reason for Revision	System Engineer / Process Engineer	Equipment Engineer	Checked	Approved	Date



River Protection Project
Waste Treatment Plant

MECHANICAL DATA SHEET

ACTIVATED CARBON ADSORBER

PLANT ITEM No.

24590-HLW-MV-HOP-ADBR-00001A/B

Data Sheet No.

24590-HLW-MVD-HOP-00015

Rev.

1

Material Data:

Process Pipe and Housing Fabrication -

Pipe Class	S11V	Valve Material	316/316L SS
Inlet Piping Size	14 inches	Valve Trim	TRIM 12, API 600
Outlet Piping Size	14 inches	Flange Material	316L SS
Housing	316L SS	Gasket Material	Spiral-Wound/Fiat, Graphite
Activated Carbon Beds Screens	316L SS	Flange Rating	CL 150 RF B16.5
Pipe schedule	TBD	Housing Insulation / Jacket	Calcium Silicate ASTM C533, Type I / 0.024" thk. SST ASTM A240
Pipe Material	316L SS	Pipe Insulation / Jacket	Calcium Silicate ASTM C533, Type I / 0.024" thk. SST ASTM A240

Fire Protection Pipe -

Pipe Class	TBD	Valve Trim	TBD
Inlet Piping Size	* 2 inches	Flange Material	TBD
Pipe schedule	TBD	Gasket Material	TBD
Pipe Material	TBD	Flange Rating	TBD
Valve Material	TBD		

Appurtenances and Other Items -

Support Frames	Carbon Steel	Fire Suppression Drain Pipe Material	TBD
Pipe Supports	Carbon Steel	Fire Suppression Drain Pipe Sch.	TBD
Maintenance Platforms	Carbon Steel	Drain Line on/off valve	TBD
Flange Bolts / Nuts	ASTM F593 / ASTM F594	Drain Line Flange Material	TBD
		Drain Line Flange Rating	TBD

Bed Fire Suppression System:

Fluid Type	Water	Full Flood Fire Suppression:		
Activation Method:		Flowrate	* 22	gpm
Temperature Y/N	No	Pressure	* 50	psig
Smoke Y/N	No	Total Volume of Water	* 5400	gal
Instrument Signal Y/N	Yes	Total Time to Fill Vessel	* 240	minutes
Instrument Type	Differential CO Monitor	Drain Pipe Line Size	* 2 inches	

Design Data:

Nozzle Loads at Buyer interface -

	F _x (lbs)	F _y (lbs)	F _z (lbs)	M _x (ft-lbs)	M _y (ft-lbs)	M _z (ft-lbs)	
Weight	200	1750	200	5250	2500	2500	
Thermal	2500	2500	3500	30000	30000	30000	
Seismic	5750	4500	8000	50000	50000	50000	
Total	8450	8750	11700	85250	82500	82500	

Thermal Information -

Room Temperature 83 °F Maximum Heat Loss 5 Δ Kw (per unit)

Earth Temperature Beneath Slab 70 °F (Fixed)

Concrete Slab Base Thickness 72 Inches

Thermal Conductivity of Concrete Slab 1.8 W / m / K

Thermal Cycling Frequency: For design purposes use a thermal cycle frequency of once every two (2) months for the life of the plant (40 years).

Environmental Qualification - Δ

Room # Δ H-A123 Δ

Environmental Conditions Δ Mild Δ

Temperature: Δ

Normal (°F) Δ 59 - 95 Δ

Accident (°F) Δ 130 Δ

Pressure (atm) Δ 1.05 Δ

Relative Humidity Δ 1 - 100% Δ

Radiation (mrads/hr) Δ 2.5 Δ

Flooding Δ

Chemical Spray Δ

Plant Induced Vibration Δ

Function post DBE Δ

Operating time post DBE Δ

Water Spray Δ

No Δ

No Δ

No Δ

N/A Δ

Note: EQ requirement are applicable to electrical components pertaining to the carbon units. The carbon units are all metallic construction and not subject to EQ.



River Protection Project
Waste Treatment Plant

MECHANICAL DATA SHEET

ACTIVATED CARBON ADSORBER

PLANT ITEM No.

24590-HLW-MV-HOP-ADBR-00001A/B

Data Sheet No.

24590-HLW-MVD-HOP-00015

Rev.

1

Activated Carbon Data -	Primary Bed	Guard Bed (if included)
Manufacturer	* Donau Carbon	* Donau Carbon
Type of carbon (charcoal, coconut shell, etc.)	* Kombisorbon BAT-37	* Desomix ZA-37 Δ
Activation element (sulfur)	* Sulfur compounds Δ	* Unimpregnated activated charcoalΔ
Carbon media form (granular, pellet, etc.)	* Granular	* Granular Δ
Size of carbon media (mm)	* 3-5	* 3-5
Bulk density	* 0.57 g/cc (36 lb/ft³) Δ	* 0.57 g/cc (36 lb/ft³) Δ
Load efficiency	* 17%	* 17%
Number of beds per vessel	* two	* two
Arrangement	* Rectangular parallel beds	* Rectangular parallel beds
Residence time, sec	* 6 (at design flow rate in SCFM) Δ	* 3 (at design flow rate in SCFM) Δ
Thickness of bed, in	* 20	* 10
Total volume of carbon, ft³ per vessel Δ	* 220 Δ	* 110 Δ
Total weight of carbon, lbs per vessel Δ	* 7920 Δ	* 3960Δ
Spacing between beds, in	* 4	* 4 and 8
Face velocity thru carbon, fpm	* 16.67 (at design flowrate in SCFM)Δ	* 16.67 (at design flowrate in SCFM)Δ
Max. allowable temp, °F	* 284	* 284
Min. allowable temp, °F	* Ambient	* Ambient
House/vessel -		
Material/Thickness	* 3/8" stainless steel with external stiffeners Δ	
Vessel dimensions, (L x W x H)	* 138" x 112" x 156"Δ	
Total weight of vessel	* est. 22,670 lbs per vessel Δ	
Weight of vessel with carbon, lbs	* 34,550 lbsΔ	
Design pressure, in-WG	* -82 in-WG (Refer to Process Note D, positive design pressure 126 in-WG) Δ	
Operating pressure, in-WG	* -18.1 in-WG Δ	
Design temperature, °F	* 250 Δ	
Recommended housing insulation:	* Calcium silicate and/or foam glass	
Material/Thickness, in	* 7 inches on sides, 1 inch over stiffeners Δ	
Thermal Cond, Btu-in/hr ft² °F	* 0.39	
Method of Attachment	* Mechanical support via outer jacket and/or straps	
Unloading on/off valve	* 8 each per vessel, each 8" size (4 ea. for Primary Bed) Δ	
Discharge Filter -		
Manufacturer	* American Air filter	
Type of filter	* Extended surface mini-pleat with metal sides	
Filter material	* microglass paper Δ	
Filter frame material	* stainless steel type 316 Δ	
Dimensions of filter, (L x W x H)	* 23-3/8" x 23-3/8" x 3-3/4" Δ	
Weight of filter, lbs	* 15 lbs Δ	
Number of filters per vessel	* 2	
Filter rating (efficiency, particle size)	* 99% on 5 micron particles	
Flowrate capacity, scfm	* 2000 per filter	
Max. allowable temp, °F	* 250 Δ	
Min. allowable temp, °F	* Ambient	



River Protection Project
Waste Treatment Plant

MECHANICAL DATA SHEET ACTIVATED CARBON ADSORBER

PLANT ITEM No.

24590-HLW-MV-HOP-ADBR-00001A/B

Data Sheet No.

24590-HLW-MVD-HOP-00015

Rev.

1

Connecting Pipe -

Pipe size, in	* 14
Material/Thickness, in	* 0.25 Δ
Total length of piping, ft	* 70 Δ
Valve type, (gate, butterfly, etc.)	* butterfly
Weight of valve, lbs	* 143 Δ
Valve manufacturer	* Centerline Valves Δ
Total number of valves	* 6
Actuators (air operated, rack and pinion, FC)	* Pneumatic, rack & pinion, Fail closed Δ
Actuator manufacture	* Hi-Tork Δ
Weight of actuator	* 50 lbs
Actuator operating pressure (min. and max.)	* 80-150 Δ
Opening time, seconds	* less than 10 seconds Δ
Total number of Actuators	* 6 per ACA unit
Required instrument air supply, scfm	* 2 SCFM/actuator Δ
Recommended piping insulation:	* Calcium silicate or foam glass
Material/Thickness, in	* 1 inches Δ
Thermal Cond, Btu-in/hr ft ² °F	* 0.39
Method of Attachment	* straps

Pneumatic Loading Equipment -

Manufacturer	* N/A
Blower size, horsepower	* N/A
Blower electrical load, watts	* N/A
Required voltage for blower	* N/A
Skid envelope size, (L x W x H)	* N/A
Skid weight, lbs	* N/A
Skid transportation/mobility	* N/A
Estimated time to load the vessel	* N/A

Note:

System designed to permit loading directly from bulk bags or drums into beds without the need for pneumatic loading devices.

Optional Electric Pre-Heater -

Manufacturer	* N/A
Heater element electric load, watts	* N/A
Required voltage for heater elements, V	* N/A
Fan electric load, watts	* N/A
Required voltage for fan, V	* N/A
Fan size, horsepower	* N/A
Skid envelope size, (L x W x H)	* N/A
Skid weight, lbs	* N/A
Skid transportation/mobility	* N/A
Estimated time to preheat the carbon, hrs	* N/A
Total electric load for skid, watts	* N/A
Total required voltage	* N/A

Note:

Electrical Pre-Heater no longer proposed - considered unnecessary.

Construction Data: (To be determined by the supplier when not specified by the buyer)

Envelope Dimensions, (L x W x H) ft	(25 x 11 x 31)	Shipping Dimensions, (L x W x H) ft	* 3 trailers, each load (15 x 10 x 9) ft
Operating Weight of unit (two vessels), lbs	* 69,100 Δ	Shipping Weight lbs	* 71,500 Δ
Full Water Flood Weight of unit (two vessels), lbs	* 114,100 Δ		



River Protection Project
Waste Treatment Plant

MECHANICAL DATA SHEET ACTIVATED CARBON ADSORBER

PLANT ITEM No.

24590-HLW-MV-HOP-ADBR-00001A/B

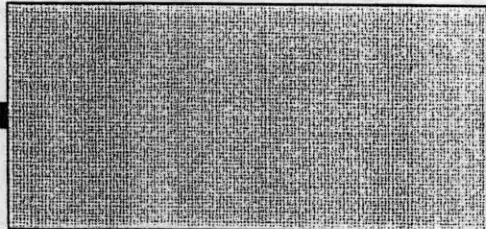
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24590-HLW-MVD-HOP-00015

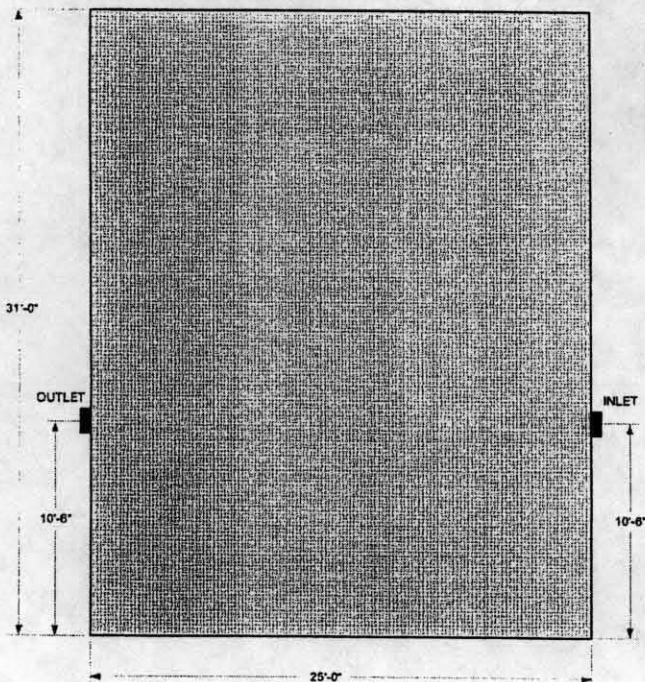
Rev.

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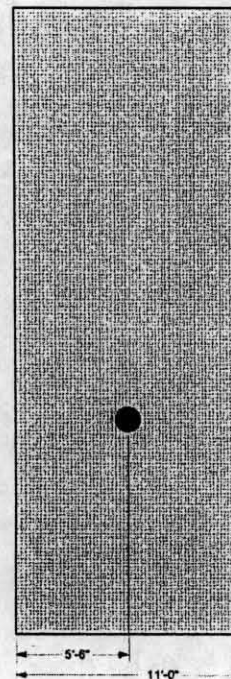
TOP VIEW



FRONT VIEW



END VIEW



Layout Notes:

- Process Inlet and Outlet nozzles are shown for clarity. Other nozzle locations will be per Seller.
- Carbon bed, piping, support frame, and maintenance platform layout shall be per Seller meeting the requirements of engineering specification 24590-WTP-3PS-MWK0-T0001.
- Pneumatic loading system shall be located per Seller's design.

General Notes

1. Data marked with an asterisk to be provided by Vendor.
2. The adsorber housing pressure boundary is designed and fabricated to ASME BPVC, Sec VIII, Div 1, the adsorbers and fire protection system are designed and fabricated to applicable ASME AG-1 requirements and the interconnect piping and valves are designed and fabricated to ASME B31.3 - 1996. The packaged unit is tested to ASME AG-1 with ASME AG-1a-2000 Addenda, and the pressure boundary pneumatically tested per ASME BPVC, Sec VIII, Div I.
3. Contents of this document are Dangerous Waste Permit affecting.



River Protection Project
Waste Treatment Plant

MECHANICAL DATA SHEET ACTIVATED CARBON ADSORBER

ISSUED BY
RPPWTP PDC

PLANT ITEM No.

R10593034

24590-HLW-MV-HOP-ADBR-00002A/B

Data Sheet No.

24590-HLW-MVD-HOP-00016

Rev.

1

Project:	RPP-WTP	Description:	Activated Carbon Unit for Mercury Abatement
Project No:	24590	Mech. Drawing:	
Site:	Hanford	P&ID:	24590-HLW-M6-HOP-20003
System:	HOP	Process Data:	24590-HLW-M6D-HOP-00001 and calculation 24590-HLW-M6C-HOP-00011
Process flow diagram:	24590-HLW-M5-V17T-20004	Specification:	24590-WTP-SPS-MWK0-T0001

General Data

Quality Level	QL-2	Design Life yrs	40 (See Process Note C for media design life requirement)
Seismic Category	SC-III		
Design Code	Note 2		
Code Stamp	N/A		
NB Registration	N/A		

Process Data

Inlet Offgas Conditions:					Gas Composition:				
		Conditions				Nominal (%)	Max (%)		
		Nominal	Max	Design					
Vol. Flow	ACFM	1559	1984	2000 SCFM @ 68 °F	N ₂	70.6	64.7	(By Volume)	
Mass Flow	lb/hr	5492	6347	N/A	O ₂	18.9	17.4	(By Volume)	
Temperature	°F	168	205	250	Ar	0.8	0.8	(By Volume)	
Pressure	in-WG	-10.4	-18.1	-82	CO ₂	0.4	0.6	(By Volume)	
Density	lb/ft ³	0.059	0.054	N/A	H ₂ O	9.2	16.4	(By Volume)	
Relative Humidity	%	23.2	18.3	N/A					
Allowable Pressure Drop		in-WG		12 (Note B)					
Process Notes: A. Carbon beds shall be operated in series during normal operation. B. Allowable pressure drop is for both carbon beds HOP-ADBR-00001A and B operating in series. (12 in-WG total) C. Design life of activated carbon media shall be for one year at nominal concentrations of Mercury with the beds operating in series. D. Equipment design pressure (Positive) shall be determined by Seller based on pressures generated during a carbon bed fire and activation of the fire suppression water.						Nominal		Maximum	
						(ppmv)	(mg/m ³)	(ppmv)	(mg/m ³)
					CO	40	34	65	50
					NO _x	614	606	2,700	2,600
					NH ₃	69	36	61	29
					SO ₂	0.047	0.093	0.032	0.056
					HCl	3.8E-03	4.3E-03	0.023	0.023
					HF	0.22	0.14	1.8	0.99
					I ₂	2.9E-09	2.3E-08	1.3E-04	8.9E-04
					SVOC	5.6	22	0.45	1.6
					VOC	9.7E-08	2.3E-07	0.22	0.47
					Particulate	2.9E-10	2.2E-10	7.3E-10	7.9E-10
					Mercury Concentration:				
	Nominal		Design						
	(µg/dscm)		(µg/dscm)						
Hg	5100		42000						
Decontamination Factor (DF) for Hg 1000									
Min Carbon Change Out Frequency months 12 (Note C) At nominal values									

Please note that source, special nuclear, and byproduct materials, as defined in the Atomic Energy Act of 1954 (AEA) are regulated at the U. S. Department of Energy (DOE) facilities exclusively by DOE acting pursuant to its AEA authority. DOE asserts that pursuant to AEA, it has sole and exclusive responsibility and authority to regulate source, special nuclear, and byproduct materials at DOE-owned nuclear facilities. Information contained herein on radionuclides is provided for process description purposes only.

1	Revised to comply with CODE 1 vendor Submittal (24590-QL-POA-MWK0-00001-09-00001), in accordance with CAR: 24590-WTP-CAR-QA-05-120. Added Environmental Qualification.					9-20-04
0	Issued for Purchase	J. Rouse	D. Pease	C. Morley	M. Hoffmann	
Rev.	Reason for Revision	System Engineer / Process Engineer	Equipment Engineer	Checked	Approved	Date



River Protection Project
Waste Treatment Plant

MECHANICAL DATA SHEET ACTIVATED CARBON ADSORBER

PLANT ITEM No.

24590-HLW-MV-HOP-ADBR-00002A/B

Data Sheet No.

24590-HLW-MVD-HOP-00016

Rev.

1

Material Data:

Process Pipe and Housing Fabrication -

Pipe Class	S11V	Valve Material	316/316L SS
Inlet Piping Size	14 inches	Valve Trim	TRIM 12, API 600
Outlet Piping Size	14 inches	Flange Material	316L SS
Housing	316L SS	Gasket Material	Spiral-Wound/Fiat, Graphite
Activated Carbon Beds Screens	316L SS	Flange Rating	CL 150 RF B16.5
Pipe schedule	TBD	Housing Insulation / Jacket	Calcium Silicate ASTM C533, Type I / 0.024" thk. SST ASTM A240
Pipe Material	316L SS	Pipe Insulation / Jacket	Calcium Silicate ASTM C533, Type I / 0.024" thk. SST ASTM A240

Fire Protection Pipe -

Pipe Class	TBD	Valve Trim	TBD
Inlet Piping Size	* 2 inches	Flange Material	TBD
Pipe schedule	TBD	Gasket Material	TBD
Pipe Material	TBD	Flange Rating	TBD
Valve Material	TBD		

Appurtenances and Other Items -

Support Frames	Carbon Steel	Fire Suppression Drain Pipe Material	TBD
Pipe Supports	Carbon Steel	Fire Suppression Drain Pipe Sch.	TBD
Maintenance Platforms	Carbon Steel	Drain Line on/off valve	TBD
Flange Bolts / Nuts	ASTM F593 / ASTM F594	Drain Line Flange Material	TBD
		Drain Line Flange Rating	TBD

Bed Fire Suppression System:

Fluid Type	Water	Full Flood Fire Suppression:		
Activation Method:		Flowrate	* 22	gpm
Temperature Y/N	No	Pressure	* 50	psig
Smoke Y/N	No	Total Volume of Water	* 5400	gal
Instrument Signal Y/N	Yes	Total Time to Fill Vessel	* 240	minutes
Instrument Type	Differential CO Monitor	Drain Pipe Line Size	* 2 inches	

Design Data:

Nozzle Loads at Buyer Interface -

	F _x (lbs)	F _y (lbs)	F _z (lbs)	M _x (ft-lbs)	M _y (ft-lbs)	M _z (ft-lbs)
Weight	200	1750	200	5250	2500	2500
Thermal	2500	2500	3500	30000	30000	30000
Seismic	5750	4500	8000	50000	50000	50000
Total	8450	8750	11700	85250	82500	82500

Thermal Information -

Room Temperature	83	°F	Maximum Heat Loss	5	Kw (per unit)
Earth Temperature Beneath Slab	70	°F (Fixed)	Thermal Cycling Frequency:	For design purposes use a thermal cycle frequency of once every two (2) months for the life of the plant (40 years).	
Concrete Slab Base Thickness	72	Inches			
Thermal Conductivity of Concrete Slab	1.8	W / m / K			

Environmental Qualification - Δ

Room #Δ	H-A123 Δ	Radiation (mrads/hr) Δ	2.5 Δ
Environmental ConditionsΔ	Mild Δ	Flooding Δ	Water SprayΔ
Temperature: Δ		Chemical Spray Δ	No Δ
Normal (°F)Δ	59 - 95 Δ	Plant Induced Vibration Δ	No Δ
Accident (°F)Δ	130 Δ	Function post DBE Δ	No Δ
Pressure (atm) Δ	1.05 Δ	Operating time post DBE Δ	N/A Δ
Relative Humidity Δ	1 - 100% Δ		

Note: EQ requirement are applicable to electrical components pertaining to the carbon units. The carbon units are all metallic construction and not subject to EQ.



River Protection Project
Waste Treatment Plant

MECHANICAL DATA SHEET ACTIVATED CARBON ADSORBER

PLANT ITEM No.

24590-HLW-MV-HOP-ADBR-00002A/B

Data Sheet No.

24590-HLW-MVD-HOP-00016

Rev.

1

Activated Carbon Data -	Primary Bed	Guard Bed (if included)
Manufacturer	* Donau Carbon	* Donau Carbon
Type of carbon (charcoal, coconut shell, etc.)	* Kombisorbon BAT-37	* Desomix ZA-37 Δ
Activation element (sulfur)	* Sulfur compounds Δ	* Unimpregnated activated charcoalΔ
Carbon media form (granular, pellet, etc.)	* Granular	* Granular Δ
Size of carbon media (mm)	* 3-5	* 3-5
Bulk density	* 0.57 g/cc (36 lb/ft³) Δ	* 0.57 g/cc (36 lb/ft³) Δ
Load efficiency	* 17%	* 17%
Number of beds per vessel	* two	* two
Arrangement	* Rectangular parallel beds	* Rectangular parallel beds
Residence time, sec	* 6 (at design flow rate in SCFM) Δ	* 3 (at design flow rate in SCFM) Δ
Thickness of bed, in	* 20	* 10
Total volume of carbon, ft³ per vessel Δ	* 220 Δ	* 110 Δ
Total weight of carbon, lbs per vessel Δ	* 7920 Δ	* 3960 Δ
Spacing between beds, in	* 4	* 4 and 8
Face velocity thru carbon, fpm	* 16.67 (at design flowrate in SCFM)Δ	* 16.67 (at design flowrate in SCFM)Δ
Max. allowable temp, °F	* 284	* 284
Min. allowable temp, °F	* Ambient	* Ambient
House/vessel -		
Material/Thickness	* 3/8" stainless steel with external stiffeners Δ	
Vessel dimensions, (L x W x H)	* 138" x 112" x 156"Δ	
Total weight of vessel	* est. 22,670 lbs per vessel Δ	
Weight of vessel with carbon, lbs	* 34,550 lbs Δ	
Design pressure, in-WG	* -82 in-WG (Refer to Process Note D, positive design pressure 126 in-WG) Δ	
Operating pressure, in-WG	* -18.1 in-WG Δ	
Design temperature, °F	* 250 Δ	
Recommended housing insulation:	* Calcium silicate and/or foam glass	
Material/Thickness, in	* 7 inches on sides, 1 inch over stiffeners Δ	
Thermal Cond, Btu-in/hr ft² °F	* 0.39	
Method of Attachment	* Mechanical support via outer jacket and/or straps	
Unloading on/off valve	* 8 each per vessel, each 8" size (4 ea. for Primary Bed) Δ	
Discharge Filter -		
Manufacturer	* American Air filter	
Type of filter	* Extended surface mini-pleat with metal sides	
Filter material	* microglass paper Δ	
Filter frame material	* stainless steel type 316 Δ	
Dimensions of filter, (L x W x H)	* 23-3/8" x 23-3/8" x 3-3/4" Δ	
Weight of filter, lbs	* 15 lbs Δ	
Number of filters per vessel	* 2	
Filter rating (efficiency, particle size)	* 99% on 5 micron particles	
Flowrate capacity, scfm	* 2000 per filter	
Max. allowable temp, °F	* 250 Δ	
Min. allowable temp, °F	* Ambient	



River Protection Project
Waste Treatment Plant

MECHANICAL DATA SHEET ACTIVATED CARBON ADSORBER

PLANT ITEM No.

24590-HLW-MV-HOP-ADBR-00002A/B

Data Sheet No.

24590-HLW-MVD-HOP-00016

Rev.

1

Connecting Pipe -

Pipe size, in	* 14
Material/Thickness, in	* 0.25 Δ
Total length of piping, ft	* 70 Δ
Valve type, (gate, butterfly, etc.)	* butterfly
Weight of valve, lbs	* 143 Δ
Valve manufacturer	* Centerline Valves Δ
Total number of valves	* 6
Actuators (air operated, rack and pinion, FC)	* Pneumatic, rack & pinion, Fail closed Δ
Actuator manufacture	* Hi-Tork Δ
Weight of actuator	* 50 lbs
Actuator operating pressure (min. and max.)	* 80-150 Δ
Opening time, seconds	* less than 10 seconds Δ
Total number of Actuators	* 6 per ACA unit
Required instrument air supply, scfm	* 2 SCFM/actuator Δ
Recommended piping insulation:	* Calcium silicate or foam glass
Material/Thickness, in	* 1 inches Δ
Thermal Cond, Btu-in/hr ft ² °F	* 0.39
Method of Attachment	* straps

Pneumatic Loading Equipment -

Manufacturer	* N/A
Blower size, horsepower	* N/A
Blower electrical load, watts	* N/A
Required voltage for blower	* N/A
Skid envelope size, (L x W x H)	* N/A
Skid weight, lbs	* N/A
Skid transportation/mobility	* N/A
Estimated time to load the vessel	* N/A

Note:

System designed to permit loading directly from bulk bags or drums into beds without the need for pneumatic loading devices.

Optional Electric Pre-Heater -

Manufacturer	* N/A
Heater element electric load, watts	* N/A
Required voltage for heater elements, V	* N/A
Fan electric load, watts	* N/A
Required voltage for fan, V	* N/A
Fan size, horsepower	* N/A
Skid envelope size, (L x W x H)	* N/A
Skid weight, lbs	* N/A
Skid transportation/mobility	* N/A
Estimated time to preheat the carbon, hrs	* N/A
Total electric load for skid, watts	* N/A
Total required voltage	* N/A

Note:

Electrical Pre-Heater no longer proposed - considered unnecessary.

Construction Data: (To be determined by the supplier when not specified by the buyer)

Envelope Dimensions, (L x W x H) ft	(25 x 11 x 31)	Shipping Dimensions, (L x W x H) ft	* 3 trailers, each load (15 x 10 x 9) ft
Operating Weight of unit (two vessels), lbs	* 69,100 Δ	Shipping Weight lbs	* 71,500 Δ
Full Water Flood Weight of unit (two vessels), lbs	* 114,100 Δ		



River Protection Project
Waste Treatment Plant

MECHANICAL DATA SHEET ACTIVATED CARBON ADSORBER

PLANT ITEM No.

24590-HLW-MV-HOP-ADBR-00002A/B

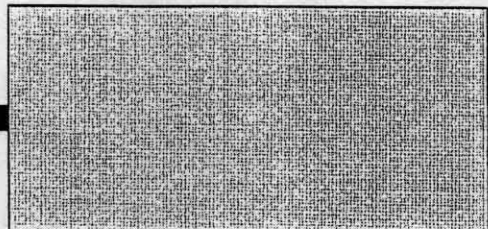
Data Sheet No.

24590-HLW-MVD-HOP-00016

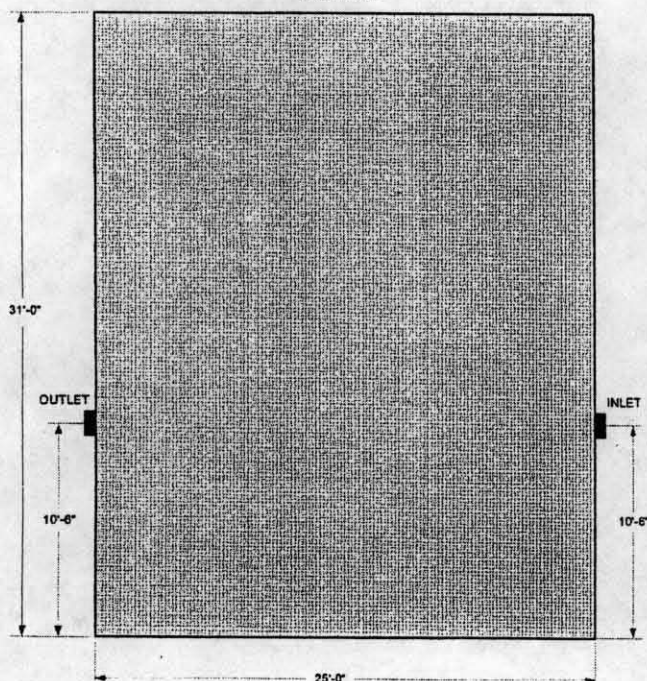
Rev.

1

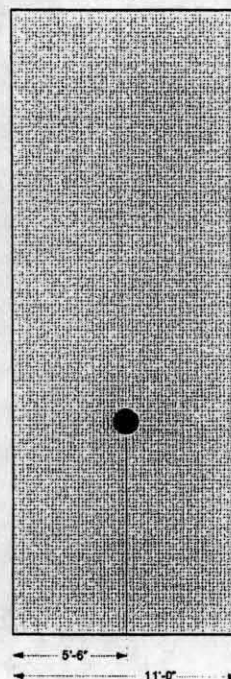
TOP VIEW



FRONT VIEW



END VIEW



Layout Notes:

- Process Inlet and Outlet nozzles are shown for clarity. Other nozzle locations will be per Seller.
- Carbon bed, piping, support frame, and maintenance platform layout shall be per Seller meeting the requirements of engineering specification 24590-WTP-3PS-MWK0-T0001.
- Pneumatic loading system shall be located per Seller's design.

General Notes

1. Data marked with an asterisk to be provided by Vendor.
2. The adsorber housing pressure boundary is designed and fabricated to ASME BPVC, Sec VIII, Div 1, the adsorbers and fire protection system are designed and fabricated to applicable ASME AG-1 requirements and the interconnect piping and valves are designed and fabricated to ASME B31.3 - 1996. The packaged unit is tested to ASME AG-1 with ASME AG-1a-2000 Addenda, and the pressure boundary pneumatically tested per ASME BPVC, Sec VIII, Div I.
3. Contents of this document are Dangerous Waste Permit affecting.

Attachment 2
07-ESQ-128

Bechtel National, Inc. Certification Statement

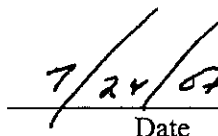
Bechtel National, Inc. Certification

The following certification statement is provided consistent with Contract No. DE-AC27-01RV14136, Section H.26, Environmental Permits, paragraph (g) for the submittal of the Hanford Facility Resource Conservation and Recovery Act Permit Modification Notification Form 24590-HLW-PCN-ENV-07-001

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.


W. S. Elkins

for Project Director


Date